General

Guideline Title

World Gastroenterology Organisation global guidelines: acute diarrhea in adults and children: a global perspective.

Bibliographic Source(s)

World Gastroenterology Organisation (WGO). World Gastroenterology Organisation global guidelines: acute diarrhea in adults and children: a global perspective. Milwaukee (WI): World Gastroenterology Organisation (WGO); 2012 Feb. 24 p.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: World Gastroenterology Organisation (WGO). WGO practice guideline: acute diarrhea. Munich, Germany: World Gastroenterology Organisation (WGO); 2008 Mar. 28 p.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- May 12, 2016 – Fluoroquinolone Antibacterial Drugs : The U.S. Food and Drug Administration (FDA) is advising that the serious side effects associated with fluoroquinolone antibacterial drugs generally outweigh the benefits for patients with sinusitis, bronchitis, and uncomplicated urinary tract infections who have other treatment options. For patients with these conditions, fluoroquinolones should be reserved for those who do not have alternative treatment options.

Recommendations

Major Recommendations

Clinical Manifestations and Diagnosis

Although there may be clinical clues, a definitive etiological diagnosis is not possible clinically (see tables below).

Table: Episodes of Diarrhea Can Be Classified into Three Categories

Category	Clinical Manifestation
Acute diarrhea	Presence of three or more abnormally loose or watery stools in the preceding 24 hours
Dysentery	Presence of visible blood in stools
Persistent diarrhea	Acutely starting episode of diarrhea lasting more than 14 days

Table: Linking the Main Symptoms to the Causes of Acute Diarrhea - Enterohemorrhagic *Escherichia coli (E. coli)* (EHEC)

Symptoms	Causes of Acute Diarrhea
Fever	• Common and associated with invasive pathogens • Pediatric details: initially present in the majority of children with rotavirus diarrhea
Bloody stools	• Invasive and cytotoxin producing pathogens • Suspect EHEC infection in the absence of fecal leukocytes • Not with viral agents and enterotoxins releasing bacteria
Vomiting	• Frequently in viral diarrhea and illness caused by ingestion of bacterial toxins (e.g., *Staphylococcus aureus*) • Common in cholera

See Table 4 in the original guideline document for clinical features of infection with selected diarrheal pathogens.

Clinical Evaluation

The initial clinical evaluation of the patient (see Table "Medical Assessment in Diarrhea" below) should focus on:

- Assessing the severity of the illness and the magnitude (degree) of dehydration (see Table "Assessment of Dehydration Using the 'Dhaka Method'" below)
- Determining likely causes on the basis of the history and clinical findings, including stool characteristics

Table: Medical Assessment in Diarrhea

Patient History	Physical Examination
• Onset, stool frequency, type and volume • Presence of blood • Vomiting • Medicines received • Past medical history • Underlying conditions • Epidemiological clues	• Body weight • Temperature • Pulse/heart and respiratory rate • Blood pressure Pediatric details: Evidence of associated problems in children

Table: Assessment of Dehydration Using the "Dhaka Method"

Assessment	Plan A	Plan B	Plan C
1. General condition	Normal	Irritable/less active*	Lethargic/comatose*

Assessment	Plan A	Plan B	Plan C
2. Eyes	Normal	Sunken	--
3. Mucosa	Normal	Dry	--
4. Thirst	Normal	Thirsty	Unable to drink*
5. Radial pulse	Normal	Low volume*	Absent/uncountable*
6. Skin turgor	Normal	Reduced*	--
Diagnosis	No dehydration	Some dehydration. At least two signs, including at least one key sign (*) are present	Severe dehydration. Signs of "some dehydration" plus at least one key sign (*) are present
Treatment	Prevent dehydration	Rehydrate with ORS solution unless unable to drink	Rehydrate with intravenous fluids and ORS
	Reassess periodically	Frequent reassessment	More frequent reassessment

*Key signs

ORS, oral rehydration salts

Laboratory Evaluation

For acute enteritis and colitis, maintaining adequate intravascular volume and correcting fluid and electrolyte disturbances take priority over the identifying the causing agent. Presence of visible blood in febrile patients generally indicates infection due to invasive pathogens, such as *Shigella*, *Campylobacter jejuni*, *Salmonella*, or *Entamoeba histolytica*. Stool cultures are usually unnecessary for immune-competent patients who present with watery diarrhea, but may be necessary to identify *Vibrio cholerae* when there is clinical and/or epidemiological suspicion of cholera, particularly during the early days of outbreaks/epidemics (also to determine antimicrobial susceptibility) and to identify the pathogen causing dysentery.

Epidemiologic clues to infectious diarrhea can be found by evaluating the incubation period, history of recent travel in relation to regional prevalence of different pathogens, unusual food or eating circumstances, professional risks, recent use of antimicrobials, institutionalization, and human immunodeficiency virus (HIV) infection risks.

Stool analysis and culture costs can be reduced by improving the selection and testing of the specimens submitted on the basis of interpreting the case information — such as patient history, clinical aspects, visual stool inspection, and estimated incubation period for. See Tables 7-9 in the original guideline document for information on patient history details and causes of acute diarrhea, incubation period and likely causes of diarrhea, and patient details and bacterial testing to consider, respectively.

Screening usually refers to noninvasive fecal tests. Certain laboratory studies may be important when the underlying diagnosis is unclear or diagnoses other than acute gastroenteritis are possible. Where applicable, rapid diagnostic tests (RDTs) may be considered for cholera quick testing at the patient's bedside.

Pediatric details. Identification of a pathogenic bacterium, virus, or parasite in a stool specimen from a child with diarrhea does not indicate in all cases that it is the cause of illness.

Measurement of serum electrolytes may be required in some children with a longer duration of diarrhea with moderate or severe dehydration, particularly with an atypical clinical history or findings. Hypernatremic dehydration is more common in well-nourished children and those infected with rotavirus, and features irritability, increased thirst disproportionate to clinical dehydration, and a doughy feel to the skin. This requires specific rehydration methods.

Prognostic Factors and Differential Diagnosis in Children

Table: Prognostic Factors in Children

Factor	Remarks
Malnutrition	• Approximately 10 percent of children in developing countries are severely underweight. • Macronutrient or micronutrient deficiencies in children are related to more severe and prolonged diarrhea, and hypokalemia and rectal prolapse are likely to develop in association with dysentery. • Poor nutritional status leads to a higher risk of death.
Zinc Deficiency	• Suppresses immune function and is associated with an increased prevalence of persistent diarrhea and a higher frequency of diarrhea.
Persistent Diarrhea	• Often results in malabsorption and significant weight loss, further promoting the cycle.
Immunosuppression	• Secondary to infection with HIV or other chronic conditions may have an increased risk for developing of clinical illness, prolonged resolution of symptoms, or frequent recurrence of diarrheal episodes.

HIV, human immunodeficiency virus

Differential diagnosis of acute diarrhea in children:

- Pneumonia—may occur together with diarrhea in developing countries
- Otitis media
- Urinary tract infection
- Bacterial sepsis
- Meningitis

Integrated Management of Childhood Illness (IMCI)

In developing countries, a large proportion of childhood morbidity and mortality is caused by five conditions: acute respiratory infections, diarrhea, measles, malaria, and malnutrition. The IMCI strategy has been developed to address the overall health of children presenting with signs and symptoms of more than one condition. In such cases, more than one diagnosis may be necessary and treatments for the conditions may have to be combined. Care needs to be focused on the child as a whole and not just the individual diseases or conditions affecting the child, while other factors that affect the quality of care delivered to children—such as drug availability, organization of the health-care system, referral pathways and services, and community behaviors—are best addressed through an integrated strategy.

The IMCI strategy encompasses a range of interventions to prevent and manage major childhood illness, both in health facilities and in the home. It incorporates many elements of the diarrheal and acute respiratory infection control program, as well as child-related aspects of malaria control, nutrition, immunization, and essential drugs program (World Health Organization [WHO], Bangladesh; see http://www.who.int/countries/bgd/en/).

Treatment Options and Prevention

Rehydration in Adults and Children

Oral rehydration therapy (ORT) is the administration of appropriate solutions by mouth to prevent or correct diarrheal dehydration. ORT is a cost-effective management of acute gastroenteritis, also in developed countries.

Oral rehydration salts (ORS), used in ORT, contain specific amounts of important salts that are lost in diarrhea stool. The new lower-osmolarity ORS (recommended by WHO and United Nations International Children's Emergency Fund [UNICEF]) has reduced concentrations of sodium and glucose and is associated with less vomiting, less stool output, lesser chance of hypernatremia, and a reduced need for intravenous infusions in comparison with standard ORS (see Table 11 in the original guideline document). This formulation is recommended irrespective of age and the

type of diarrhea including cholera.

ORT consists of:

- Rehydration — water and electrolytes are administered to replace losses.
- Maintenance fluid therapy to take care of ongoing losses once rehydration is achieved (along with appropriate nutrition).

ORT is contraindicated in the initial management of severe dehydration and also in children with paralytic ileus, frequent and persistent vomiting (more than four episodes per hour), and painful oral conditions such as moderate to severe thrush (oral candidiasis). However, nasogastric administration of ORS solution is potentially life-saving when intravenous rehydration is not possible and the patient is being transported to a facility where such therapy can be administered.

Rice-based ORS is superior to standard ORS for adults and children with cholera, and can be used to treat such patients wherever its preparation is convenient. It is not superior to standard ORS in the treatment of children with acute noncholera diarrhea, especially when food is given shortly after rehydration, as is recommended to prevent malnutrition.

Supplemental Zinc Therapy, Multivitamins, and Minerals in Children

Zinc deficiency is widespread among children in developing countries. Routine zinc therapy, as an adjunct to ORT is useful in modest reduction of the severity but more importantly reduce diarrhea episodes in children in developing countries. The recommendation for all children with diarrhea is 20 mg of zinc per day for 10 days. Infants aged 2 months or younger should receive 10 mg per day for 10 days.

Supplementation with zinc sulfate in recommended doses reduces the incidence of diarrhea during the following 3 months, and reduces nonaccidental deaths by as many as 50%. It is more important in the management of diarrhea in malnourished children and persistent diarrhea. The WHO and UNICEF recommend routine zinc therapy for children with diarrhea, irrespective of the types.

All children with persistent diarrhea should receive supplementary multivitamins and minerals, including magnesium, each day for 2 weeks. Locally available commercial preparations are often suitable; tablets that can be crushed and given with food are least costly. These should provide as broad a range of vitamins and minerals as possible, including at least two recommended daily allowances (RDAs) of folate, vitamin A, zinc, magnesium, and copper. (See Table 12 in the original guideline document for RDA guide for a 1-year-old child.)

Diet

The practice of withholding food for >4 hours is inappropriate - normal feeding should be continued for those with no signs of dehydration, and food should be started immediately after correction of some (moderate) and severe dehydration, which usually takes 2–4 hours, using ORT or intravenous rehydration.

Pediatric details. Breastfed infants and children should continue receiving food, even during the rehydration phase. However, for non-breastfed, dehydrated children and adults, rehydration is the first priority and that can be accomplished in 2–4 hours.

The notes below apply to both adults and children unless age is specified.

Provide:

- An age-appropriate diet — regardless of the fluid used for ORT/maintenance
- Frequent, small meals throughout the day (six meals/day), particularly for infants and young children
- Energy and micronutrient-rich, mixed foods (grains, eggs, meats, fruits, and vegetables)
- Increasing energy intake as tolerated following the diarrheal episode
- Pediatric details. Infants require more frequent breastfeeding or bottle feedings—special formulas or dilutions are unnecessary. Older children and adults should receive their normal food and drinks. Children, particularly young children, should be given one additional meal following resolution of their diarrhea for catch-up growth.

Avoid:

- Canned fruit juices — these are hyperosmolar and can aggravate diarrhea.

Probiotics are live microorganisms, such as *Lactobacillus* GG (ATCC 53103), with demonstrated beneficial health effects in humans. However, the effects are strain-specific and need to be verified for each strain in human studies. Extrapolation from the results of even closely related strains is not possible, and significantly different effects have been reported. Use of probiotics may not be appropriate in resource-constrained settings, mostly in developing countries. Refer to the original guideline document for more information on the use of probiotics for the treatment of acute

diarrhea.

Pediatric details. Controlled clinical intervention studies and meta-analyses support the use of specific probiotic strains and products in the treatment and prevention of rotavirus diarrhea in infants.

Nonspecific Antidiarrheal Treatment

None of the drugs listed below addresses the underlying causes of diarrhea (loss of water, electrolytes, and nutrients). Antiemetics are usually unnecessary in acute diarrhea management, and some that have sedative effects may make ORT difficult.

Pediatric details. In general, antidiarrheals have no practical benefits for children with acute or persistent diarrhea.

Antimotility Agents

Loperamide (4–6 mg/day) is the agent of choice for adults:

- Should be used mostly for mild to moderate traveler's diarrhea (without clinical signs of invasive diarrhea)
- Inhibits intestinal peristalsis and has mild antisecretory properties
- Should be avoided in bloody or suspected inflammatory diarrhea (febrile patients)
- Significant abdominal pain also suggests inflammatory diarrhea (this is a contraindication for loperamide use).
- Pediatric details. Not recommended for use in children—has been demonstrated to increase disease severity and complications, particularly in children with invasive diarrhea.

Antisecretory Agents

Racecadotril is an enkephalinase inhibitor (nonopiate) with antisecretory activity:

- Not useful in adults with cholera
- Pediatric details. It has been found useful in children with diarrhea, and is now licensed in many countries in the world for use in children.

Adsorbents

Kaolin-pectin, activated charcoal, attapulgite:

- Inadequate proof of efficacy in acute adult diarrhea, adds to the costs, and thus should not be used.

Antimicrobials in Adults and Children

See Table 15 in the original guideline document for information on antimicrobial agents for the treatment of specific causes of diarrhea.

Important Notes

- All doses shown in Table 15 are for oral administration.
- Selection of an antimicrobial should be based on the susceptibility patterns of strains of the pathogens in the locality/region.
- Antimicrobials are reliably helpful and their routine use is recommended in the treatment of severe (clinically recognizable):
    - Cholera, shigellosis, typhoid and paratyphoid fevers
    - Dysenteric presentation of campylobacteriosis and nontyphoidal salmonellosis when they cause persistent diarrhea, and when host immune status is compromised for any reason such as severe malnutrition, chronic liver disease, or lymphoproliferative disorders.
    - Invasive intestinal amebiasis.
    - Symptomatic giardiasis (anorexia and weight loss, persistent diarrhea, failure to thrive).
- Consider antimicrobial treatment for:
    - *Shigella*, *Salmonella*, *Campylobacter* (dysenteric form), or parasitic infections
    - Nontyphoidal salmonellosis among at-risk populations (malnutrition, infants and elderly, immunocompromised patients, and those with liver diseases and lymphoproliferative disorders), and in dysenteric presentation
    - Moderate/severe traveler's diarrhea or diarrhea with fever and/or with bloody stools
    - Antimicrobials are also indicated for associated health problems such as pneumonia
- *Amebae*. Nonpathogenic amebae are more often detected in stool microscopy and get wrongly treated. The presence of ingested erythrocyte in an ameba (hematophagus) stool microscopy indicates invasiveness and a need for treatment; also when the presentation is dysenteric and no other invasive pathogen has been detected. Treatment for amebiasis should ideally include diloxanide furoate following the metronidazole, to get rid of the cysts that may remain after the metronidazole treatment; nitazoxanide is an alternative.

- *Azithromycin* is widely available and has the convenience of single dosing. For treating most types of common bacterial infection, the recommended azithromycin dosage is 250 mg or 500 mg once daily for 3–5 days. Pediatric dosage: the azithromycin dosage for children can range (depending on body weight) from 10 mg to 20 mg per kilogram of body weight per day, once daily for 3 days.
- *Campylobacter*. Quinolone-resistant *Campylobacter* is present in several areas of South-East Asia (e.g., Thailand) and azithromycin is the appropriate option in such situations.
- *Cholera*. Routine antimicrobial therapy is recommended for treatment of severe (clinically recognizable) cholera. The actual selection of an antimicrobial will depend on recent susceptibility of the pathogen in specific countries; in the absence of such information, susceptibility reports from neighboring countries is the only other choice.
- *Erythromycin* is hardly used for diarrhea today.
- *Nitazoxanide* is an effective antiprotozoal in the treatment of diarrhea caused by parasites such as *Giardia intestinalis*, *Entamoeba histolytica*, and *Cryptosporidium parvum*.
- *Traveler's diarrhea*. For adults with acute diarrhea, there is good evidence that a single-dose therapy with some newer quinolones, such as ciprofloxacin, shortens the duration of acute traveler's diarrhea. However, this is still controversial; use should be limited to high-risk individuals or those needing to remain well for short visits to a high-risk area. *Antimicrobials should be considered the drugs of choice for empirical treatment of traveler's diarrhea* and of community-acquired secretory diarrhea when the pathogen is known (see Table 15 in the original guideline document).

Pediatric details:

- If drugs are not available in liquid form for use in young children, it may be necessary to use tablets and estimate the doses given in Table 15 (see the original guideline document).
- Consider antimicrobial treatment for:
  - When *Shigella*, *Salmonella*, *Campylobacter* (dysenteric form) are the only pathogen isolated from children with persistent diarrhea
  - Nontyphoidal salmonellosis in infants
- Alternative antimicrobials for treating cholera in children are trimethoprim/sulfamethoxazole (TMP/SMX; 5 mg/kg TMP + 25 mg/kg SMX, 12-hourly for 3 days), and norfloxacin.

Prevention of Diarrhea with Vaccines

- *Salmonella typhi*: two typhoid vaccines (with limited cost-efficiency) currently are approved for clinical use.
- *Shigella* organisms: three vaccines have been shown to be immunogenic and protective in field trials. Parenteral vaccines may be useful for travelers and the military personnel, but are impractical for use in developing countries. More promising is a single-dose live-attenuated vaccine currently under development in several laboratories.
- *V. cholerae*: the current price and need for multiple doses (at least two) and shorter protective efficacy are limitations. A new, cheaper killed-cell vaccine is likely to be available soon; oral cholera vaccines are still being investigated, and their use is recommended only in complex emergencies such as epidemics. Their use in endemic areas remains controversial. In traveler's diarrhea, oral cholera vaccine is only recommended for those working in refugee or relief camps, since the risk of cholera for the usual traveler is very low.
- Enterotoxigenic *E. coli* (ETEC) vaccines: the most advanced ETEC vaccine candidate consists of a killed whole-cell formulation plus recombinant cholera toxin B subunit. No vaccines are currently available for protection against Shiga toxin-producing *E. coli* infection.

Pediatric details:

- *Salmonella typhi*: no available vaccine is currently suitable for routine use for children in developing countries.
- Rotavirus: in 1998, a rotavirus vaccine, RotaShield (Wyeth), was licensed in the USA for routine immunization of infants. In 1999, production was stopped after the vaccine was causally linked to intussusception in infants. Other rotavirus vaccines are being developed, and preliminary trials are promising. Currently, two vaccines have been approved: a live oral vaccine, RotaTeq, made by Merck for use in children, and GSK's Rotarix.
- Measles immunization can substantially reduce the incidence and severity of diarrheal diseases. Every infant should be immunized against measles at the recommended age.

Clinical Practice

Approach in Adults with Acute Diarrhea

1. Perform initial assessment.
2. Manage dehydration.
3. Prevent dehydration in patients with no signs of dehydration, using home-based fluids or ORS solution.

- Rehydration of patients with some dehydration using ORS, and correct dehydration of a severely dehydrating patient with an appropriate intravenous fluid.
- Maintain hydration using ORS solution.
- Treat symptoms (if necessary, consider bismuth subsalicylate or loperamide in cases of nondysenteric traveler's diarrhea).

4. Stratify subsequent management:
    - Epidemiological clues: food, antibiotics, sexual activity, travel, day-care attendance, other illness, outbreaks, season.
    - Clinical clues: bloody diarrhea, abdominal pain, dysentery, wasting, fecal inflammation.
5. Obtain a fecal specimen for analysis:
    - If there is severe, bloody, inflammatory, or persistent diarrhea, and at the beginning of an outbreak/epidemic.
6. Consider antimicrobial therapy for specific pathogens.
7. Report to the public health authorities.
    - In outbreaks, save culture plates and isolates; freeze fecal specimens and food or water specimens at –70°C.
    - Notifiable in the USA: cholera, cryptosporidiosis, giardiasis, salmonellosis, shigellosis, and infection with Shiga toxin–producing *E. coli* (STEC).

Approach in Children with Acute Diarrhea

In 2002, WHO and UNICEF revised their recommendations for routine use of hypoosmolar ORS, and in 2004 recommended routine use of zinc as an adjunct to ORT for treatment of childhood diarrhea, irrespective of etiology. Since then, more than 40 countries throughout the world have adopted the recommendations. In countries where both the new ORS and zinc have been introduced, the rate of ORS usage has dramatically increased. Principles of appropriate treatment for children with diarrhea and dehydration:

- No unnecessary laboratory tests or medications.
- Use ORS for rehydration:
    - Perform ORT rapidly, within 3–4 hours.
    - Routine adjunct zinc therapy for children aged 5 years or younger.
- When dehydration is corrected, rapid re-alimentation:
    - Normal food or age-appropriate unrestricted diet.
    - Continue breastfeeding.
- Administer additional ORS for ongoing losses through diarrhea.

Table: Treatment for Children Based on the Degree of Dehydration

Degree of Dehydration	No or Minimal Dehydration	Mild to Moderate Dehydration	Severe Dehydration
Rehydration Therapy	None	ORS 50–100 mL/kg body weight over 3–4 hours. If vomiting is persistent, the patient (child or adult) will not take ORS and is likely to need intravenous fluids.	Rehydrate with Ringer's lactate solution (100 mg/kg) intravenously within 4–6 hours. Then administer ORS to maintain hydration until patient recovers.
Replacement of Losses	<10 kg body weight: 50–100 mL ORS for each diarrheal stool or vomiting episode		
Nutrition	Continue breastfeeding or age-appropriate normal diet.	Continue breastfeeding, or resume age-appropriate normal diet after initial hydration	

ORS, oral rehydration salts

Cautionary Notes

- It is dangerous to treat patients with severe diarrheal dehydration using 5% dextrose with 1/4 normal saline, and the risk of death is very high. In diarrheal dehydration, not only water but also a number of electrolytes are lost; the important ones are sodium, potassium, and bicarbonate.
- The loss of sodium is greater in cholera than in ETEC diarrhea (60–110 mmol/L), followed by rotavirus diarrhea (around 20–40 mmol/L)—

three leading causes of severe dehydrating diarrhea.

- Efforts to correct dehydration using solutions with lower amounts of sodium (such as 38.5 mmol/L in 1/4 saline with 5% dextrose) would lead to sudden and severe hyponatremia with a high risk of death.
- Ringer's lactate is the appropriate solution for management of severe dehydration, but normal saline may be life-saving, irrespective of age, when Ringer's lactate is not available. In such cases, ORS should be initiated as soon as patients (adults and children) are able to drink, to replace bicarbonate and potassium lost in diarrheal stools, particularly for children.
- For acute bloody diarrhea (dysentery) in children, the main principles of the therapeutic approach are:
    - Treatment of dehydration
    - Stool microscopy to assess the need for antimicrobial therapy. Demonstration of invasive forms of *E. histolytica* and vegetative *Giardia intestinalis* in a symptomatic patient would provide a direct diagnosis, and the presence of inflammatory cells would indicate invasive diarrhea and institution of an appropriate antimicrobial agent after a fecal specimen has been sent for culture where possible.
    - Frequent, smaller meals with higher protein intakes

See Figure 1 in the original guideline document for an algorithm for the therapeutic approach to acute bloody diarrhea in children.

Home Management of Acute Diarrhea in Adults and Children

Milder and uncomplicated cases of nondysenteric diarrhea in both adults and children can be treated at home, regardless of the etiologic agent, using home-based fluid or ORS as appropriate. Parents/ caregivers of children should be educated to recognize signs of dehydration, and when to take children to health facility for treatment. Early intervention and administration of home-based fluids/ORS reduces dehydration, malnutrition, and other complications and leads to fewer clinic visits and potentially fewer hospitalizations and deaths.

Self-medication is safe in otherwise healthy adults. It relieves discomfort and social dysfunction. There is no evidence that it prolongs the illness. However, this may not be appropriate in developing countries where diarrhea requiring specific interventions, is more prevalent, and people may not be competent in assessing their conditions.

Principles of self-medication:

- Maintain adequate fluid intake.
- Consumption of solid food should be guided by appetite in adults; small, but more frequent meals for children.
- Antidiarrheal medication with loperamide (flexible dose according to loose bowel movements) may diminish diarrhea and shorten the duration.
- Antimicrobial treatment is reserved for prescription only in residents' diarrhea or for inclusion in travel kits (add loperamide).

Where feasible, families in localities with a high prevalence of diarrheal diseases should be encouraged to store a few ORS packets and zinc tablets if there are children under the age of five in the family for initiating home therapy as soon as diarrhea starts.

See the original guideline document for a home-made oral fluid recipe.

Antidiarrheal agents. Among hundreds of over-the-counter products promoted as antidiarrheal agents, only loperamide and bismuth subsalicylate have sufficient evidence of efficacy and safety.

Family knowledge. Family knowledge about diarrhea must be reinforced in areas such as prevention, nutrition, ORT/ORS use, zinc supplementation, and when and where to seek care.

Indications for medical consultation or in-patient care are:

- Caregiver's report of signs consistent with dehydration
- Changing mental status
- History of premature birth, chronic medical conditions, or concurrent illness
- Young age (<6 months or <8 kg weight)
- Fever ≥38°C for infants <3 months old or ≥39°C for children aged 3–36 months
- Visible blood in stool
- High-output diarrhea, including frequent and substantial volumes
- Persistent vomiting, severe dehydration, persistent fever
- Suboptimal response to ORT, or inability of caregiver to administer ORT
- No improvement within 48 hours—symptoms exacerbate and overall condition gets worse
- No urine in the previous 12 hours

Cascades

A cascade is a hierarchical set of diagnostic or therapeutic techniques for the same disease, ranked by the resources available.

Table: Cascade for Acute, Severe, Watery Diarrhea – Cholera-like, with Severe Dehydration

Resources: High to Low
Level 1 Intravenous fluids + antibiotics + diagnostic tests: stool microscopy/culture Based on tests: tetracycline, fluoroquinolone
Level 2 Intravenous fluids + antibiotics Empirical: tetracycline, fluoroquinolone or other
Level 3 Intravenous fluids + ORT
Level 4 Nasogastric tube ORS -- if persistent vomiting
Level 5 ORT
Level 6 Home-made oral fluid: salt, sugar, and clean water

ORS, oral rehydration salts; ORT, oral rehydration therapy

Cautions

- If facilities for referral are available, patients with severe dehydration (at risk of acute renal failure or death) should be referred to the nearest health-care facility with intravenous fluids (levels 5 and 6 cannot replace the need for referral in case of severe dehydration).
- Levels 5 and 6 must be seen as interim measures and are better than no treatment if no intravenous facilities are available.
- When intravenous therapy is used, it must be ensured that disposable sterile syringes, needles and drip sets are used, to avoid the risk of hepatitis B and C.
- The U.S. Food and Drug Administration (FDA) has issued a warning that serious nerve damage can potentially be caused by fluoroquinolones.

Notes

- Nasogastric therapy requires skilled staff.
- Often, intravenous fluid treatment is more easily available than nasogastric tube feeding. (*Caution*: there is a risk of infection with contaminated intravenous infusion equipment.)

Pediatric Details

- Nasogastric feeding is not very feasible for healthy and active older children, but it is suitable for malnourished, lethargic children.
- Nasogastric administration (ORS and diet) is especially helpful in long-term severely malnourished children (anorexia).

Table: Cascade for Acute, Mild/Moderate, Watery Diarrhea with Mild/Moderate Dehydration

Resources: High to Low
Level 1 Intravenous fluids (consider) + ORT
Level 2 Nasogastric tube ORS—if persistent vomiting
Level 3 ORT
Level 4 Home-made oral fluid: salt, sugar, and clean water

ORS, oral rehydration salts; ORT, oral rehydration therapy

Cascade for Acute Bloody Diarrhea, with Mild/Moderate Dehydration

Resources: High to Low
Level 1 ORT + antibiotics + diagnostic tests: stool microscopy/culture Consider causes: *S. dysenteriae*, *E. histolytica*, Severe bacterial colitis
Level 2 ORT + antibiotics Empirical antibiotics for moderate/severe illness
Level 3 ORT
Level 4 Home-made oral fluid: salt, sugar, and clean water

ORT, oral rehydration therapy

Clinical Algorithm(s)

An algorithm titled "Therapeutic Approach to Acute Bloody Diarrhea in Children" is provided in the original guideline document.

Scope

Disease/Condition(s)

Acute diarrhea

Guideline Category

Diagnosis

Evaluation

Management

Prevention

Risk Assessment

Treatment

Clinical Specialty

Family Practice

Gastroenterology

Infectious Diseases

Internal Medicine

Nutrition

Pediatrics

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Nurses

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To provide a guideline for management, treatment, and prevention of acute diarrhea that is as globally relevant and accessible as possible

Target Population

Children and adults with acute diarrhea

Interventions and Practices Considered

Diagnosis/Evaluation

1. Clinical evaluation of acute diarrhea
    - History
    - Physical examination
    - Severity of diarrhea
    - Assessment of dehydration status using the "Dhaka Method"
    - Determining likely causes on the basis of the history and clinical findings, including stool characteristics
2. Laboratory evaluation
    - Evaluating epidemiologic clues
    - Fecal specimen analysis and culture
    - Serum electrolytes (children only)
3. Prognostic factors and differential diagnosis

Treatment/Management/Prevention

1. Treatment of dehydration
    - Rehydration therapy (oral rehydration salt [ORS] solution, nasogastric tube ORS if persistent vomiting, intravenous fluids, home-made oral fluid)
    - Nutrition (nutritional supplements [e.g., zinc, multivitamin, minerals], age-appropriate diet)
2. Probiotics
3. Pharmacologic treatment
    - Antimotility agents
    - Antisecretory agents
    - Adsorbents
    - Antimicrobials (empirical or culture-based)
4. Vaccines for prevention
5. Home management versus in-patient care

Major Outcomes Considered

- Duration of symptoms
- Childhood morbidity (e.g., diminished growth, impaired cognitive development)
- Incidence of comorbidity (e.g., human immunodeficiency virus [HIV])
- Mortality
- Cost of treatment

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

World Gastroenterology Organisation's (WGO's) Graded Evidence System

WGO's 'Graded Evidence' system is built to help National Societies of Gastroenterology and all those interested in the practice and research of gastroenterology keep track of the literature in topics covered by WGO Guidelines. Most guidelines are based on evidence which is out of date as they appear. Sometimes the 'lag time' is as much as 2–3 years. WGO's Graded Evidence system bridges this gap. WGO Guidelines are constantly reviewed and updates are built when new information becomes available.

Level 1 Evidence is collected from PubMed and includes meta-analyses, systematic reviews, randomized controlled trials and evidence-based practice guidelines.

Gastroenterology and hepatology journals scanned:

- Gastroenterology
- Hepatology
- Gut
- Journal of Hepatology
- Nature Reviews Gastroenterology and Hepatology
- American Journal of Gastroenterology
- Seminars in Liver Disease
- Clinical Gastroenterology and Hepatology
- Endoscopy
- Gastrointestinal Endoscopy

General medical journals scanned:

- New England Journal of Medicine
- Lancet
- JAMA-Journal of the American Medical Association
- Annals of Internal Medicine
- PLOS Medicine
- BMJ - British Medical Journal
- JAMA Internal Medicine
- Canadian Medical Association Journal
- BMC Medicine
- Cochrane Database of Systematic Reviews

Coverage

Graded Evidence is an iterative process - and for that reason need not be so concerned with searching both Medline, EMBASE and Biosis for example. All top gastrointestinal (GI) journals are covered by both Medline and EMBASE and in single one-off complex searches unique citations in one or the other are often due either to differences in database currency or differences in coverage of less important journals. In addition to cost issues, the generous republishing and copyright policies of the US National Library of Medicine (NLM) make Medline the preferred choice. The WGO Graded Evidence library is grateful to the NLM for making data available to clinicians and practitioners outside the US for free.

Search Strategies

Search strategies for each topic are based on a combination of controlled access and free text terms. The strategies aim for 'precision rather than 'sensitivity'. Highly sensitive search strategies as for example used by the Cochrane Collaboration when collecting literature reviews produce many irrelevant records. The advantage is these strategies retrieve all records which are relevant to a topic. But the 'number needed to read' is large and thus time consuming. Busy gastroenterologists probably prefer very precise search strategies in top GI journals and thus make sure every major article is found. The WGO Graded Evidence works along the lines of PubMed Medline 'Clinical queries' features. Precise searches only find relevant information. Indexing errors may still be responsible for irrelevant or duplicate records. Case studies and animal studies are not usually included.

Graded Evidence records link directly to PubMed-Medline and from here the searcher can follow the various link options to find similar records or an indication of how to find full text.

Guideline-specific Methods

For the current update of the guideline, EMBASE.com, including PubMed and the Cochrane databases, was searched from 2002 through June 1, 2011. The Review Committee is kept up to date with all current and new evidence through the Graded Evidence and Evidence Alert update services based on monthly high level evidence searches in EMBASE/Medline.

Number of Source Documents

- Meta-analyses, systematic reviews, practice guidelines: 25
- Clinical trials (randomised controlled trials only after 2012): 15

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Each citation is assessed in terms of the quality of an article and how relevant it is for the guideline topic in question. Articles are then scored by assigning one or several stars:

Grade Key

- Key Development: 3 stars
- Very Important: 2 stars
- Important: 1 star
- Special Mention: no star

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Graded Evidence

The World Gastroenterology Organisation (WGO) Guidelines Library contains practice guidelines written from a viewpoint of global applicability. WGO Guidelines are available in English, Spanish, Portuguese, French, Mandarin and Russian. WGO Guidelines go through a rigorous process of authoring, editing and peer review and are as evidence based as possible. Ultimate responsibility and editorial control lies with the WGO Guidelines Committee.

Each guideline includes references to other relevant guidelines. These are collected, summarized and re-published or linked-to by WGO for the benefit of members. In many instances, there will be more than one guideline. For example guidelines on Colorectal Cancer Screening are published by WGO, but the Scottish Intercollegiate Guidelines Network (SIGN) also publishes guidelines on this topic as does the New Zealand Guidelines Group and the Canadian Medical Association.

WGO is the only organisation, however, who has adopted a global focus. Cascade-based WGO guidelines offer different treatment options for diagnosis and treatment depending on the resources available. A cascade is a hierarchical set of diagnostic or therapeutic techniques for the same disease, ranked according to the resources available.

WGO Guidelines are globally applicable by the nature of their cascades, which identify other ways of achieving the best possible outcome by taking the available resources into account. In addition, each guideline review team includes non-Western experts with direct knowledge of

conditions in their regions.

Guideline-specific Methods

The Expert Committee convened to review the currency of the guideline in the last 5 years (2009-2013). All committee members receive all Level 1 evidence from the relevant searches. The Committee Chair decides in case of controversy and the Committee agrees consensus. All communication is by email.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

World Gastroenterology Organisation (WGO) Guidelines go through a rigorous process of authoring, editing and peer review and are as evidence based as possible.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate diagnosis, treatment, and management of acute diarrhea in children and adults
Reduced morbidity and mortality from acute diarrhea

Potential Harms

- Use of ciprofloxacin for traveler's diarrhea is still controversial; use should be limited to high-risk individuals or those needing to remain well for short visits to a high-risk area.
- V. cholera vaccine use remains controversial in endemic areas.
- There is a risk of infection with contaminated intravenous infusion equipment.

Contraindications

Contraindications

- Loperamide should be avoided in bloody or suspected inflammatory diarrhea (febrile patients). It is not recommended for use in children—has been demonstrated to increase disease severity and complications, particularly in children with invasive diarrhea. Significant abdominal pain suggests inflammatory diarrhea (this is a contraindication for loperamide use).
- Oral rehydration therapy (ORT) is contraindicated in the initial management of severe dehydration and also in children with paralytic ileus, frequent and persistent vomiting (more than four episodes per hour), and painful oral conditions such as moderate to severe thrush (oral candidiasis).

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Foreign Language Translations

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

World Gastroenterology Organisation (WGO). World Gastroenterology Organisation global guidelines: acute diarrhea in adults and children: a global perspective. Milwaukee (WI): World Gastroenterology Organisation (WGO); 2012 Feb. 24 p.

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2008 Mar (revised 2012 Feb)

Guideline Developer(s)

World Gastroenterology Organisation - Medical Specialty Society

Source(s) of Funding

World Gastroenterology Organisation (WGO)

Guideline Committee

Review Team

Composition of Group That Authored the Guideline

Review Team: Prof. M. Farthing (*Chair*, United Kingdom); Prof. M. Salam (*Special Advisor*, Bangladesh); Prof. G. Lindberg (Sweden); Prof. P. Dite (Czech Republic); Prof. I. Khalif (Russia); Prof. E. Salazar-Lindo (Peru); Prof. B.S. Ramakrishna (India); Prof. K. Goh (Malaysia); Prof. A. Thomson (Canada); Prof. A.G. Khan (Pakistan); Dr. J. Krabshuis (France); Dr. A. LeMair (Netherlands)

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: World Gastroenterology Organisation (WGO). WGO practice guideline: acute diarrhea. Munich, Germany: World Gastroenterology Organisation (WGO); 2008 Mar. 28 p.

Guideline Availability

Electronic copies: Available from the World Gastroenterology Organisation (WGO) Web site .

Print copies: Available from the WGO, 555 East Wells Street, Suite 1100, Milwaukee, WI 53202 USA; Phone: +1 (414) 918-9798; Fax: +1 (414) 276-3349; E-mail: info@worldgastroenterology.org.

Availability of Companion Documents

The following is available:

- Graded evidence. Professor André Elewaut and Professor John Fevery's essential reading. Electronic copies: Available from the World Gastroenterology Organisation (WGO) Web site .

French, Mandarin, Spanish, and Portuguese translations of the original guideline are available from the WGO Web site .

Print copies: Available from the WGO, 555 East Wells Street, Suite 1100, Milwaukee, WI 53202 USA; Phone: +1 (414) 918-9798; Fax: +1 (414) 276-3349; E-mail: info@worldgastroenterology.org.

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 13, 2008. This summary was updated by ECRI Institute on April 1, 2010 following the U.S. Food and Drug Administration advisory on Rotarix Vaccine. This summary was revised by ECRI Institute on June 3, 2010 following the updated U.S. Food and Drug Administration advisory on Rotarix Vaccine. This summary was updated by ECRI Institute on October 25, 2013 following the U.S. Food and Drug Administration advisory on Fluoroquinolone Antibacterial Drugs. This NGC summary was updated by ECRI Institute on January 8, 2014. The updated information was verified by the guideline developer on February 3, 2014. This summary was updated by ECRI Institute on May 18, 2016 following the U.S. Food and Drug Administration advisory on Fluoroquinolone Antibacterial Drugs.

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